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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/723,189
Filing Date: November 26, 2003
Appellant(s): AVINASH, GOPAL B.

John M. Rariden
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 2/15/2008 appealing from the Office action mailed 8/23/2007.

(1) Real Party in Interest

A statement identifying by name the real party of in interest is contained in the brief.

(2) Related Appeals and Interferences

The Examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct. However, the examiner notes that claims 26, 27 were included in the final Office action (dated 8/23/2007) under 35 U.S.C. 101 by means of a typographical error. These claims should not be considered to be rejected under 35 U.S.C. 101. However Claims 28-29 remain rejected under 35 U.S.C. 101 as stated in the final rejection.

(4) Status of Amendments after Final

No amendment after final has been filed.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct. However, the Examiner notes again that claims 26, 27 were included in the Final office action (dated 8/23/2007) under 35 U.S.C. 101 by means of a typographical error. These claims should not be considered to be rejected under 35 U.S.C. 101. However Claims 28-29 remain rejected under 35 U.S.C. 101 as stated in the final rejection.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

2002/0093686

Fan et al.

07-2002

(9) Grounds of Rejection

Rejections Under 35 U.S.C. 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

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Claims 28-29¹ are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claims 28 and 29 recite an image which does not impart functionality to a computer or computing device, and is thus considered nonfunctional descriptive material. Such nonfunctional descriptive material, in the absence of a functional interrelationship with a computer, does not constitute a statutory process, machine, manufacture or composition of matter and is thus non-statutory per se. Non-functional descriptive is non-statutory regardless of whether it is claimed as residing on a computer readable medium. See MPEP 2106.01 (II)

Rejections under 35 U.S.C. 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-2, 4-7, 9-15, 17-29 are rejected under 35 U.S.C. 102(b) as being anticipated by Fan et al USPGPUB 2002/0093686.

¹ The examiner notes that claims 26,27 were included in the Final office action (dated 8/23//2007) under 35 U.S.C. 101 by means of a typographical error. These claims should not be considered to be rejected under 35 U.S.C. 101. However Claims 28-29 remain rejected under 35 U.S.C. 101 as stated in the Final rejection.

Re claim 1 Fan discloses a method for processing image data comprising: identifying a first group of pixels exhibiting a first characteristic (high local contrast paragraph 26 line 1-3) wherein the first characteristic corresponds to structures in the image data (areas of high local contrast paragraph 26); identifying a second group of pixels exhibiting a second characteristic (low local contrast paragraph 26 lines 4-5 and $d \geq B$ paragraph 22) wherein the second characteristic corresponds to non-structures in the image data (areas of low contrast paragraph 26 $d \leq B$ paragraph 22); identifying a third group of pixels exhibiting the first and second characteristics (moderate local contrast $A < d < B$ paragraph 26 lines 11-12); processing the first group of pixels in accordance with at least a first operation (low pass filtering paragraph 20 and paragraph 26 line 5); processing the second group of pixels in accordance with at least a second operation (notch filtering Paragraph 20 and paragraph 26 line 9); processing the third group of pixels in accordance with the at least first and second operations (low pass and notch filtering paragraph 20 and paragraph 26 lines 14-15); and blending (linear combination paragraph 20 and paragraph 26 lines 12-14) values resulting from processing of the third group of pixels by the first process (low pass filtering paragraph 20 paragraph 26 lines 14-15) with values resulting from processing of the third group of pixels by the second process (notch filtering paragraph 20 and paragraph 26 lines 14-15).

Re claim 2 Fan further discloses combining the blended values with values of pixels from the first and second groups resulting from their respective processing

(paragraph 26 note these values are clearly combined to form image "Pout").

Re claim 4 Fan further discloses establishing first and second thresholds, and wherein the first group of pixels are identified as having values falling above the first threshold (claim 5 element f), the second group of pixels are identified as having values falling below the second threshold (see claim 5 element e), and the third group of pixels are identified as having values between the first and second thresholds (claim 5 element g).

Re claim 5 Fan further discloses wherein the thresholds are gradient thresholds (paragraph 22 note the contrast values is calculated using the maximum difference between pixels in a window which is a form of gradient meaning the thresholds will also be gradient based).

Re claims 6 Fan further discloses wherein the blending is performed based upon relative proximity of each pixel value to the first and the second threshold (see paragraph 24 equation 1 note the blending equation is based on the value alpha which is threshold meaning the blending is performed based upon relative proximity of each pixel value to the first and the second threshold.

Re claim 7 Fan further discloses wherein the blending is based on a linear function (linear combination paragraph 26).

Re claim 9 Fan further discloses wherein the operations are selected from a group consisting of enhancement, sharpening, smoothing, deconvolution, extrapolation, interpolation, compression, digital half-toning, and contrast matching. (see abstract note the enhancement by sharpening (notch-filter) and smoothing(low pass filter) is being done)

Re claim 10 Fan further discloses wherein the third group of pixels are processed in accordance with the first operation (low pass filtering) along with the first group of pixels (low contrast pixels), and are processed in accordance with the second operation (notch filtering) along with the second group of pixels (high contrast pixels). See paragraph 26.

Re claim 11 Fan discloses A method for processing image data comprising: establishing first and second thresholds (claim 5 elements e and f); identifying a first group of pixels having a values falling below the first threshold (claim 5 element e) wherein the first characteristic corresponds to structures in the image data (areas of high contrast paragraph 26); identifying a second group of pixels having a value falling above the second threshold (claim 5 element f) wherein the second characteristic corresponds to non-structures in the image data (areas of low contrast paragraph 26

Note examiner is interpreting structure to be high frequency detail areas of the image which are areas of high contrast); identifying a third group of pixels having a value between the first and second thresholds (claim 5 element g); processing the first group of pixels in accordance with at least a first operation (low pass filtering claim 5 element e) ; processing the second group of pixels in accordance with at least a second operation(notch filtering claim 5 element f); and processing the third group of pixels in accordance with the at least first and second operations(claim 5 element g);.

Re claim 12 Fan further discloses blending (linear combination paragraph 26 lines 12-14) values resulting from processing of the third group of pixels by the first process (low pass filtering paragraph 26 lines 14-15) with values resulting from processing of the third group of pixels by the second process (notch filtering paragraph 26 lines 14-15).

Re claim 13 Fan further discloses wherein the thresholds are gradient thresholds (paragraph 22 note the contrast values is calculated using the maximum difference between pixels in a window which is a form of gradient meaning the thresholds will also be gradient based).

Re claims 14 Fan further discloses wherein the blending is performed based upon relative proximity of each pixel value to the first and the second threshold (see paragraph 24 equation 1 note the blending equation is based on the value alpha which

is threshold meaning the blending is performed based upon relative proximity of each pixel value to the first and the second threshold.

Re claim 15 Fan further discloses wherein the blending is based on a linear function (linear combination paragraph 26).

Re claim 17 Fan further discloses wherein the operations are selected from a group consisting of enhancement, sharpening, smoothing, deconvolution, extrapolation, interpolation, compression, digital half-toning, and contrast matching. (see abstract note the enhancement by sharpening (notch-filter) and smoothing(low pass filter) is being done)

Re claim 18 Fan further discloses combining the blended values with values of pixels from the first and second groups resulting from their respective processing (paragraph 26 note these values are clearly combined to form image "Pout").

Re claim 19 Fan further discloses wherein the third group of pixels are processed in accordance with the first operation (low pass filtering) along with the first group of pixels (low contrast pixels), and are processed in accordance with the second operation (notch filtering) along with the second group of pixels (high contrast pixels). See paragraph 26.

13. The method of claim 11, wherein the thresholds are gradient thresholds.

Re claim 20 Fan discloses a system for processing image data comprising: a data repository for storing image data (note the image must be stored somewhere while processing); a processing circuit (note fan discloses using a processor for his system, see claim 11) configured to access image data from the repository (note the processor must have access to the image data), to separate the data representative of pixels into first (high contrast) and second groups (low contrast) and an overlapping group (moderate contrast see paragraph 26) , to process the first and second groups in accordance with first (low pass filter) and second operations (high pass filter), respectively, and to process the third group in accordance with both the first and second operations (see paragraph 26), and to combine the results of the processing to obtained processed image data (Pout see paragraph 26) wherein the first characteristic corresponds to structures in the image data (areas of high contrast paragraph 26); and the second group corresponds to non structures in the image data (areas of low contrast paragraph 26 Note examiner is interpreting structure to be high frequency detail areas of the image which are areas of high contrast).

Re claim 21 Fan further discloses an operator workstation (processing system paragraph 18) for configuring the operations and for viewing images resulting from the processing.

Re claim 22 Fan further discloses an image data acquisition (scanner paragraph 18) system for generating the image data.

Re claim 23 Fan further discloses wherein the image data acquisition system is selected from a group consisting of MRI systems, CT systems, PET systems, ultrasound systems, X-ray systems and photographic systems. (note a scanner is a photographic system see paragraph 18)

Re claim 24, Claim 24 is interpreted to invoke 112 6th paragraph. Claim 24 is described as the means for performing the steps of claim 1, this has been interpreted to be a work station configured with the appropriate software to perform the method. Fan discloses performing his method this way in claim 11.

Re claim 25, Claim 25 is interpreted to invoke 112 6th paragraph. Claim 25 is described as the means for performing the steps of claim 11, this has been interpreted to be a work station configured with the appropriate software to perform the method. Fan discloses performing his method this way in claim 11.

Re claim 26, Claim 26 is a computer readable medium storing code to perform the method of claim 1. Fan also discloses software for performing his method in claim 11.

Re claim 27, Claim 27 is a computer readable medium storing code to perform the method of claim 1. Fan also discloses software for performing his method in claim 11.

Re claim 28 Fan discloses an image produced by the method of claim 1. (Note Pout is the output image see paragraph 26)

Re claim 29 Fan discloses an image produced by the method of claim 11. (Note Pout is the output image see paragraph 26)

(10) Response to Argument

Applicants arguments filed on 2/15/2007 have been fully considered but they are not persuasive.

A) The rejection of claims 28-29 Under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

The appellant argues on page 9: "With respect to claims 28 and 29, the Examiner stated that they "claim an image which is merely data and therefore has no functional relationship." Final Office Action, p. 4. Claims 28 and 29 generally recite, a computer memory device (i.e., machine) storing an image. These claims are directed toward a device, they are not merely directed toward data, such as an image, as

asserted by the Examiner. According to legal precedent, devices are recognized as patentable subject matter. Therefore, image data stored on a computer memory device, as described in claims 28 and 29, is patentable because it results in a transformation of the memory device, which is a manufacture. For at least these reasons among others, Appellants respectfully request withdrawal of these rejections under 35 U.S.C. §101."

Examiners Response: Claims 28 and 29 recite an image which does not impart functionality to a computer or computing device, and is thus considered nonfunctional descriptive material. Such nonfunctional descriptive material, in the absence of a functional interrelationship with a computer, does not constitute a statutory process, machine, manufacture or composition of matter and is thus non-statutory per se. Non-functional descriptive is non-statutory regardless of whether it is claimed as residing on a computer readable medium.

See MPEP 2106.01 (II) "Nonfunctional descriptive material that does not constitute a statutory process, machine, manufacture, or composition of matter and should be rejected under 35 U.S.C. 101. Certain types of descriptive material, such as music, literature, art, photographs, and mere arrangements or compilations of facts or data, without any functional interrelationship is not a process, machine, manufacture, or composition of matter. USPTO personnel should be prudent in applying the foregoing guidance. Nonfunctional descriptive material may be claimed in combination with other functional descriptive multi-media material on a computer-readable medium to provide

the necessary functional and structural interrelationship to satisfy the requirements of 35 U.S.C. 101."

Since the appellant's computer readable medium as claimed has no functional descriptive material stored therein the claim must be considered non-statutory.

B) The Examiner rejected claims 1-2, 4-7, 9-15, and 17-29 Under 35 U.S.C. 102(b) as being anticipated by Fan.

Appellant's Argument:

The appellant argues on page 10 "As stated above, independent claims 1, 11, 20, and 24-27, each generally recite that two distinct processes are performed exclusively on two groups of pixels and that both processes are performed on a third group of pixels. The Fan reference appears to disclose performing the same operation on all input pixel values, i.e., applying contrast-weighted low pass and notch filters to each pixel. See Fan p. 2, para. 20-24. In other words, the Fan reference appears to disclose a method that performs one process (the weighted application of low pass and notch filters) on all pixels - not a method that has distinct operations performed exclusively on at least two of three groups of pixels."

Examiner's Response:

First applicant's statement that the independent claims recite "two distinct processes are performed exclusively on two groups of pixels" not required by the open

ended nature of the claim. The relevant portions of claim 1 are "processing the **first group of pixels** in accordance with **at least a first operation**; processing the **second group of pixels** in accordance with **at least a second operation**;" the claim language clearly indicates an absence of exclusivity, the first and second operation could be preformed on both the first and second groups of pixel so long as at least the first operation is preformed on the first group and at least the second operation is preformed on the second group. This claim is open ended and does not preclude intermediate or additional steps by the prior art. To the contrary, the claim language "at least" invites or includes performing additional processes.

Furthermore applicant asserts that Fan uses only one process however there is clear evidence to the contrary. Even in applicants arguments the two processes can be found, a **Low pass filter** and a **Notch filter**. The fact that subsequent to performing these processes a subset of the output pixels are found based on a weighted combination of these processes does not make them one process.

Appellant's Argument:

On page 10 and 11 Applicant argues "However, the Examiner proposes that the assignment of a weighting value of one or zero to areas of low contrast or high contrast, respectively, to Equation 1 in Fan results in only one operation being performed on either low or high contrast pixels. Advisory Action, p. 2. In particular, the Examiner's position appears to be that the application of a weighted variable of zero to one or both

operations, the low pass filter and the high pass filter of Equation 1, results in a zero filter value for the respective operation when the weighted variable is equal to zero. See Fan, par. 20- 25.

Conversely, it appears clear that the technique of the Fan reference still applies one process (i.e., the application of both low pass and notch filters) to all pixels even in the Examiner's construction. In the Examiner's extreme scenario, the local contrast weighting results in a low-pass filter value of zero in certain cases and a notch filter value of zero in other cases. However, there is no indication in Fan that in these extreme scenarios both filtering operations are not applied, just that the result of the operations is zero. This understanding is supported by the Fan reference itself which clearly states that the weighting variable may range anywhere from zero to one. See Fan, par. 20. Clearly zero weightings would not be needed or contemplated if the filters were not applied, i.e., if the operation were not performed, in such extreme scenarios."

Examiner's response:

Regarding the above arguments by the appellant the Examiner respectfully disagrees with the appellant's characterization of the Fan reference and the purported context of the Examiner's statements. The Examiner will first provide a brief explanation of the Fan reference as it pertains to the claim language in order to clarify, followed by addressing the appellant's arguments.

Fan discloses takes an image (Pin(x,y) paragraph 20) and on said image performs two distinct processes: a first process (low-pass filter paragraph 20) to create a low pass version of the image (Plpf (x,y) paragraph 20) and a second process (a notch filter paragraph 20) to create a high pass version of the image (Pnf(x,y) paragraph 20). Following these steps Fan calculates a difference (d) for each pixel (paragraph 22) which is representative of variance or change within the area around the pixel (3X3 window paragraph 22). Fan uses this local contrast value (d) to separate the pixels into three groups via the following conditional statement taken directly from Fan (it is located between paragraphs 22 and 23).

IF $d \leq A$ THEN $\alpha = 1$;

IF $A < d < B$ THEN $\alpha = (B - d) / (B - A)$, where $1 > \alpha > 0$

IF $d \geq B$ THEN $\alpha = 0$.

Alpha, the local contrast variable, is subsequently used as a weighting variable. The first group of pixels for which $d \geq B$ Fan assigns $\alpha=0$ meaning that in the output (Pout(x,y) paragraph 24) of these pixels will just be the value of Pnf (x,y) at those pixel locations. This is known from Equation 1 found in paragraph 24 of Fan

$$Pout(x,y) = \alpha * Plpf(x,y) + (1 - \alpha) Pnf(x,y)$$

Clearly one can see $Pout(x,y) = Pnf(x,y)$ when $\alpha=0$. (i.e. processed by the first process)

The second group of pixels for which $d \leq A$ and Fan assigns $\alpha=1$ the value $Pout(x,y)$ at these pixel location will be the value of Plpf(x,y) (i.e. processed by the second process) at the pixel locations. Again this is clear from Equation 1 above.

The third group of pixels for which $A < d < B$ for which fan assigns $\alpha = (B - d) / (B - A)$, where $1 > \alpha > 0$. Since these pixels have $1 > \alpha > 0$ from equation 1 we know that $P_{out}(x,y)$ will be a blending of both $P_{lpf}(x,y)$ and $P_{nf}(x,y)$ (i.e. processed by a combination of the first and second processes).

Referring back to applicants arguments from Fan it is clear two processes are being performed, a first notch filter process to generate $P_{nf}(x,y)$ (paragraph 20) and a second low pass process to generate $P_{lpf}(x,y)$ (paragraph 20). Although these processes are performed prior to splitting the pixels of $P(x,y)$ into three groups; the processes are performed to all pixels of the input image $P(x,y)$ (see paragraph 20). Therefore the first group of pixels is processed by at least the first process; the second group of pixels are processed by at least the second process; and the third group of pixels are processed by at least both the process and the second process. Again there is no notion of exclusivity present in any of the claim language, to the contrary the language **at least** implies a lack of exclusivity and invites other processes to be performed.

Furthermore the above arguments by the appellant can be addressed **even if** some sort of **exclusivity was required** by the claim; a different view of Fan would still apply. Fan would still apply because although both processes may be performed on all the input pixels strictly speaking they are not performed on the output pixels. Another way to view Fan is to say the actual processing of the three groups of pixels is performed by $P_{out}(x,y) = \alpha * P_{lpf}(x,y) + (1 - \alpha) P_{nf}(x,y)$. In this case P_{out} for the first group

($\alpha=0$) would the be processed only by the first operation by looking up and only applying a value Pnf. Pout for the second group ($\alpha=1$) would the be processed only by the second operation by looking up and only applying a value Plpf. Pout for the third group ($0<\alpha<1$) would then be processed by both the first and second operation by looking up and applying values for both Plpf and Pnf. Therefore Fan would still apply because in the output image the first group of pixels has not been processed by the second process and the second group of pixels has not been processed by the first operation during creation of the output image. This notion is stated concisely in claim 5 of Fan. "The method of claim 1, wherein step d) includes: e) producing the descreened output pixel value based on the low-pass filtered pixel value (second process) when the local contrast value is less than or equal to a first threshold value; f) producing the descreened output pixel value based on the notch-filtered pixel value (first process) when the local contrast value is greater than or equal to a second threshold value; and g) producing the descreened output pixel value based on the combination of the low-pass filtered pixel value and the notch-filtered pixel value when the local contrast value is greater than the first threshold value and less than the second threshold value." Note the local contrast value is (d) (as described by the examiner above) and the above operations are achieved by setting a local contrast variable (alpha defined by Fan as the Examiner has noted above.

With regard to the appellant's discussion of the Examiner remarks about the local contrast weighting being one or zero, here the Examiner was pointing out how the

image is divided into three groups. The Examiner further points out that what the appetent refers to as an "extreme scenario" is not viewed by the examiner to be extreme. In fact not only is a zero or one contrast value (weight) specifically addressed in Fan but they are a major component of Fan as claimed By Fan in claims 3, 13 and 20. Also again claim 5 states the operation most clearly: "The method of claim 1, wherein step d) includes: e) producing the descreened output pixel value based on the low-pass filtered pixel value when the local contrast value is less than or equal to a first threshold value; f) producing the descreened output pixel value based on the notch-filtered pixel value when the local contrast value is greater than or equal to a second threshold value; and g) producing the descreened output pixel value based on the combination of the low-pass filtered pixel value and the notch-filtered pixel value when the local contrast value is greater than the first threshold value and less than the second threshold value."

Finally again none of the claims prohibit performing the second operation on the first group of pixels, to the contrary they invite performing additional processes.

Appellant's Arguments:

On page 11 and 12 the appellant argues "Moreover, contrary to legal precedent (e.g., the *Phillips* and *Cortright* cases discussed above), the Examiner has failed to construct the claims consistent with the specification and as one of ordinary skill in the art would. Instead, the Examiner has improperly assumed a position in contrast with the plain language of the claims. In particular, independent claims 1, 11, 20, and 24-27

recite, in generally similar language, processing a first group of pixels in accordance with at least a first operation, processing a second group of pixels in accordance with at least a second operation, and processing a third group of pixels in accordance with the at least first and second operations. This is further clarified by reference to the present application where it is explained that two distinct operations are contemplated and are performed exclusive of one another on at least two of the groups of pixels, then both of the operations are performed on a third group of pixels. See, e.g., Application, page 10, lines 13-19, Fig. 3.

In spite of the apparent sufficiency of the claim language and of the discussion in the specification, the Examiner has taken the position that the recited first and second operations can be the same operation. Advisory action, page 2. However, such a position is incompatible with plain language of the claims, in particular, the recitations that at least the first and second operations are performed on the third group of pixels. This language would be superfluous if the first and second operations could be identical, as posited by the Examiner. Therefore, the interpretation asserted by the Examiner is unreasonable at least in view of the plain language of the pending independent claims.

Examiner's Response:

The above arguments are in reference to a statement made by the examiner in arguments in the final rejection. The Examiner never made any rejection on the basis above and therefore the above statements the appellant refers to are not relevant to the

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Fan rejection. The Examiner asserts Fan contains two distinct processes as described hereinabove.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

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For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Sean Motsinger

/Sean Motsinger/

5/1/2008

Conferees:

Jingge Wu

/Jingge Wu/

Supervisory Patent Examiner, Art Unit 2624

Brian Werner

/Brian P. Werner/

Supervisory Patent Examiner, Art Unit 2624

